

REMARKS

Reconsideration and allowance of the above-identified Application in view of the above amendments and the following remarks are respectfully requested.

Claims 1-4, 6 and 8-19 are pending in the Application, claims 5 and 7 having been canceled herewith.

The Examiner indicated that the Title of the Invention was not descriptive. Therefore, Applicants have provided a new Title which is clearly indicative of the invention to which the claims are directed.

The Examiner objected to claim 1 regarding support for etching undercuts of polysilicon. Therefore, Applicants have amended independent claims 1 and 13 to clarify the intended meaning.

The Examiner rejected claims 1, 7-9, 11 and 12 under 35 U.S.C. § 102(e) as being anticipated by Matsunuma et al. (U.S. Publication No. 2004/0121593). Applicants have amended claim 1 to include the limitations of previous claim 5, and amended claim 6 to put it in independent form. Claim 7 has been canceled. Therefore, since claims 8, 9, 11 and 12 each contains all the limitations of base claim 1, as amended, Applicants respectfully submit that they are also patentable over Matsunuma et al. Therefore, Applicants respectfully request that the rejection of claims 1, 8, 9, 11 and 12 under 35 U.S.C. § 102(e) as being anticipated by Matsunuma et al. be withdrawn.

The Examiner rejected claims 1-3, 7, 8, 13 and 14 under 35 U.S.C. § 102(b) as being anticipated by Guo (U.S. Publication No. 2003/0211684). The rejection of claim 7 is moot since Applicants have canceled claim 7. The rejection of claims 1-3 and 8 has been obviated by including the limitations of claim 5 into claim 1. Applicants have amended claim 13 to recite “etching said hard mask by plasma etching to form a thin hard mask pattern by using a photoresist pattern as an etching mask so that the hard mask pattern can have a narrower width than that of the photoresist pattern.”

In contrast, the Guo patent describes forming a hard mask layer 58 of SiON on gate material layers 54, 56 by using a BRAC 60 and a photoresist 62. The bottom gate material layer is further etched by using the hard mask layer 58 as an etching mask. The Guo

reference neither discloses nor suggests a difference between the width of the photoresist 62 and that of the hard mask layer 58. Therefore, Applicants respectfully submit that claims 1-3, 8, 13 and 14 are now in condition for allowance and request that the rejection under 35 U.S.C. § 102(b) as being anticipated by Guo be withdrawn.

The Examiner rejected claims 4-6, 9-12 and 15-19 under 35 U.S.C. § 103(a) as being unpatentable over Guo, in view of Matsunuma et al., Aminpur et al. (U.S. Patent No. 6,482,726), Wolf “Silicon Processing for the VLSI ERA,” volume 2, page 192, Bergman (U.S. Patent No. 5,332,445) and pages 3 and 4 of the current Application. Applicants respectfully submit that the rejections of claims 4-6, 9-12, 15-19 have been obviated for at least the following reasons.

As noted above, the Guo reference neither discloses nor suggests a difference between the width of the photoresist 62 and that of the hard mask 58. Similarly, there is no such disclosure in Aminpur et al. Aminpur et al. forms a hard mask 540 and a second hard mask 50, each having a thickness in the range of 500 Å to 5,000 Å. The first and second hard masks are formed of a different material to be selectively etched by later processing. The Aminpur et al. reference is thus very different from the instant invention.

In addition, Aminpur et al. forms a trimmed photoresist mask 570 by forming a photoresist pattern 560 on the second mask 550 and trimming the photoresist pattern 560. Next, a hard mask pattern 650 is formed by anisotropically etching the second hard mask 550 using the trimmed photoresist mask 570 as an etching mask. The trimmed photoresist mask 570 is removed and the first hard mask 540 is selectively etched to form a selectively etched hard mask 740. Thus, Aminpur et al. is very different from the instant invention as clarified in the claims.

The Matsunuma reference discloses using rhuthenium as a hard mask material in consideration of etching selectively between the hard mask and polysilicon gate. The rhuthenium hard mask is removed by using an oxygen/nitrogen ashing process. In contrast, claim 13 recites selectively removing the hard mask pattern using a wet etch while protecting the polysilicon layer and the oxide layer from etching.

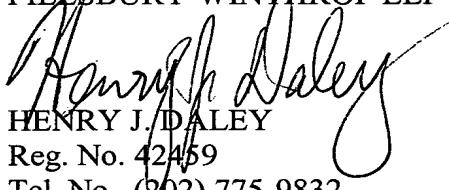
The Bergman reference discloses a method of etching a mask using HF. The Bergman reference is thus completely different from the present invention. Applicants thus

respectfully submit that the above-noted six cited references neither teach nor suggest all of the features recited in current claims 4, 6, 9-12 and 15-19, regardless of whether they are considered individually or combined. Therefore, Applicants respectfully submit that claims 4, 6, 9-12 and 15-19 are now in condition for allowance and request that the rejection under 35 U.S.C. § 103(a) be withdrawn.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

PILLSBURY WINTHROP LLP

  
HENRY J. DALEY  
Reg. No. 42459  
Tel. No. (202) 775-9832  
Fax No. 703 905-2500

Date: January 25, 2005  
P.O. Box 10500  
McLean, VA 22102  
(703) 905-2000